Introducing VPC: A mixed reality VideoProducer for the AccessGrid

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Problems

- Lack of an easy way to incorporate different media types
- Low interactivity of pure video conferencing

Aims

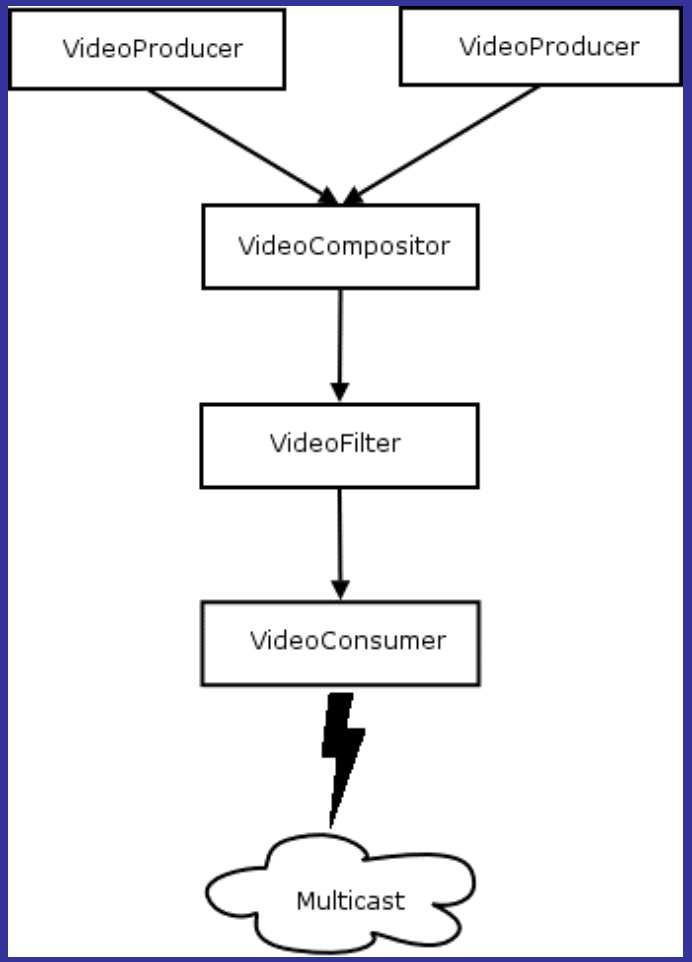
- Create a flexible framework that allows multiple media formats to be streamed as video
- Create interesting applications based on multiple mixed media formats

VPC

- VPC (Virtual Presence Capture), a framework for developing VideoProducer applications for the AccessGrid
- Simple
- Flexible
- Linux only at this stage

Architecture

- VideoProducer
- VideoFilter
- VideoCompositor
- VideoConsumer



VideoProducers

- Video for Linux
- JPEG Image file
- AVI video file
- OpenGL renderering
- OpenSceneGraph renderings and animations
- VRML renderings and animations
- Augmented Reality (AR) Toolkit

An aside: The ARToolkit

- Uses special markers to insert 3D objects into video streams
- Most commonly used for Head Mounted Displays
- Released under GPL

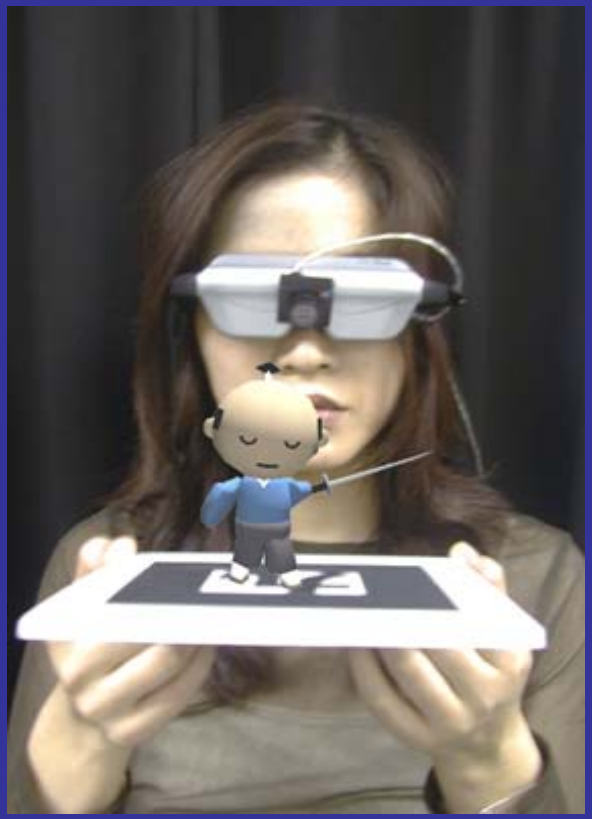


Image from http://www.hitl.washington.edu/artoolkit/

VideoFilters

- Negative
- OpenGL overlays

VideoCompositors

- Overlay
- Watermark
- Chromakey Compositing

VideoConsumers

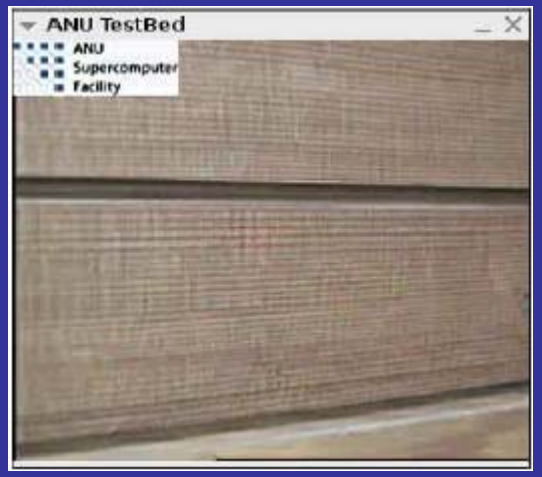
- H261 and MPEG4 Video streams direct to a multicast address

Applications

- Basic applications:
  - Watermarking and Branding video streams
  - Movie player
  - Augmented Reality
- More advanced
  - Chromakey compositing + devserver
  - Augmented Reality as an interaction device
  - Chromakey compositing + Augmented Reality + devserver for mixed reality

Demos

Overlay (Video stream Branding)



Chromakey Compositing

Augmented Reality

AR Interaction: Pointing

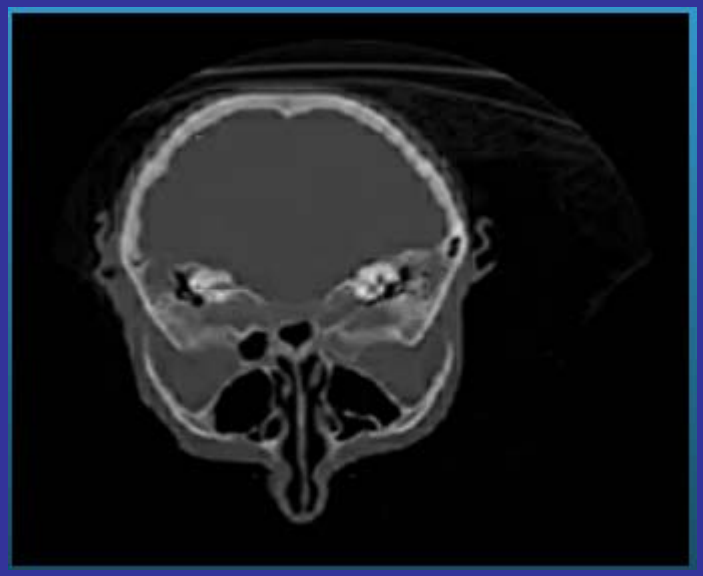
View of presenter with 3D pointer

View of object with super-imposed pointer

AR Interaction: Data Slicing

View of Presenter with Slice Plane

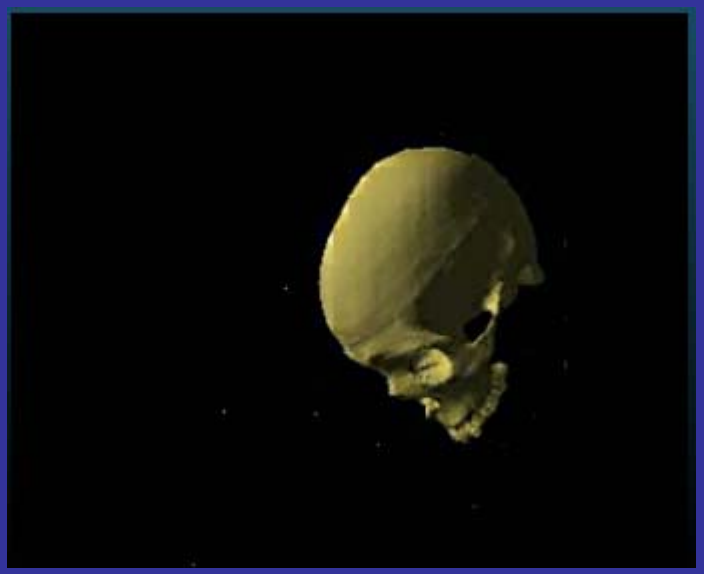
Image of corresponding Slice



AR Interaction: Viewpoint Manipulation

Video of Presenter

View from Camera of model



Current Status

- First release for AGR05
- Linux only
- Some basic applications:
  - Simple video capture
  - Movie player
- Demos

Future work

- Most AG nodes have multiple cameras, so using multiple cameras for AR would provide better tracking and redundancy
- Port to Windows and Mac

Future work continued

- Virtual Archeological dig project
  - Guided tour of a archeological dig via the AccessGrid
  - 3D Objects (eg reconstructed vases)
  - 3D reconstruction of the site
  - Photos, video etc
- Will utilize chroma key compositing + devserver + AR toolkit for an immersive mixed reality experience

The End

- Questions?